



Environment, Health & Safety Division

May 25, 2006
Dir-06-028

MEMORANDUM

To: AFRD, ALS, CSD, EETD, ESD, GN, LSD, MSD, NSD, and PBD Division Directors

From: Howard Hatayama, Acting Director EH&S Division *HH*

Re: Laser Safety Assurances for DOE Berkeley Site Office (BSO)

During inspections of our laser labs conducted in November and December 2005, Berkeley Lab EH&S and the DOE Berkeley Site Office (BSO) identified some laser safety issues including intentionally disconnecting interlocks. On December 21, 2005, Phyllis Pei sent you an email alerting you to this problem and requested several actions including:

- Verifying operation of laser interlocks for Class 4 systems
- Ensuring proper eyewear is worn
- Confirming proper signage is posted on doors
- Assuring laser table housekeeping is maintained to prevent stray reflections

The EH&S Division developed a corrective action plan to address these deficiencies. One action is to conduct comprehensive reviews of all Class 3B and 4 laser labs. This activity was originally scheduled to be completed by April 30, 2006. However, the sudden departure of our former Laser Safety Officer, the need to provide real time customer support (e.g., eyewear selection, AHD review, interlock safety, etc.), and the need to develop/improve our infrastructure (AHD database, laser inventory, inspection procedures, and documentation) caused us to delay this effort. This activity is now anticipated to begin in June/July 2006 (supported by the new Laser Safety Officer) and will include:

- Conducting and documenting laser safety inspections
- Reviewing activity hazard documents (AHDs)
- Reviewing completeness of the laser inventory
- Checking laser protective eyewear
- Testing interlock systems

We committed to BSO to have these completed by September 30, 2006, and they will accompany us during these inspections.

In the interim, BSO requested some assurance that laser safety requirements are in place. Therefore, I'm requesting that you provide me with an update by July 1, 2006 on the actions requested in Phyllis Pei's email (attached) and that you include laser safety inspections during your regular walkthroughs if you are not already doing so. I've attached copies of correspondences with BSO to give you some background on our dealings with BSO on this issue. Thank-you for your attention to this issue.

cc: Paul Blodgett, LBNL
Carol Ingram, BSO
Neil Landau, BSO
Eugene Lau, LBNL
Peter Lichty, LBNL
Larry McLouth, LBNL
David McGraw, LBNL

Enclosures

Subject: Action Required: Laser Safety Deficiencies

From: Phyllis Pei <PCPei@lbl.gov>

Date: Wed, 21 Dec 2005 16:02:44 -0800

To: William A Barletta <WABarletta@lbl.gov>, Christine M Celata <CMCelata@lbl.gov>, Janos Kirz <JKirz@lbl.gov>, Benedict Feinberg <B_Feinberg@lbl.gov>, Daniel M Neumark <DMNeumark@lbl.gov>, Ali Belkacem <ABelkacem@lbl.gov>, Bo Bodvarsson <GSBodvarsson@lbl.gov>, Ernest L Majer <ELMajer@lbl.gov>, Mark D Levine <MDLevine@lbl.gov>, Donald F Grether <DFGrether@lbl.gov>, Eddy Rubin <EMRubin@lbl.gov>, James D Bristow <JBristow@lbl.gov>, Joe W Gray <JWGray@lbl.gov>, Rebecca Rishell <RRishell@lbl.gov>, A Paul Alivisatos <APAlivisatos@lbl.gov>, Mark Alper <MDAlper@lbl.gov>, James Symons <TJSymons@lbl.gov>, Volker Koch <VKoch@lbl.gov>, Jay D Keasling <JDKeasling@lbl.gov>, Heinz M Frei <HMFrei@lbl.gov>

CC: SChu@lbl.gov, GRFleming@lbl.gov, DCMcGraw@lbl.gov, NJPadgett@lbl.gov, Nancy J Padgett <NJPadgett@lbl.gov>, Patricia M Thomas <PMThomas@lbl.gov>, Georgeanna M Perdue <GMPerdue@lbl.gov>, Jerome J Bucher <JJBucher@lbl.gov>, Jil T Geller <JTGeller@lbl.gov>, Weyland Wong <W_Wong@lbl.gov>, Guy O Kelley <GOKelley@lbl.gov>, Kathryn Nobrega <nobregak@eorm.com>, Tony Linard <AMLinard@lbl.gov>, Rick Kelly <RJKelly@lbl.gov>, Tom Hardy <TOHardy@lbl.gov>, Jeffrey G Pelton <JGPelton@lbl.gov>, Carole Fried <CAFried@lbl.gov>, Paul M Blodgett <PMCBlodgett@lbl.gov>, Larry McLouth <LDMcLouth@lbl.gov>, Ted Decastro <TMDecastro@lbl.gov>, Robert William Schoenlein <RWSchoenlein@lbl.gov>, Eugene W Lau <EWLau@lbl.gov>

To: Division Directors and Deputies who have laser systems

cc: Division Safety Coordinators

cc: Chair, Laser Safety Committee

During recent inspections of laser labs, we have uncovered some safety issues. The most serious of these is defeated or disconnected interlock control systems, which may pose exposure risks to employees, visitors and guests. **This is a violation of our laser safety policy.**

DOE's Berkeley Site Office staff is aware of these conditions and has formally requested the Lab to develop a Corrective Action Plan. The plan includes EHS staff conducting comprehensive field inspections of all laser labs. BSO personnel will be accompanying us on these walkthroughs. Exact time schedules will be worked out with your respective Division Safety coordinators.

In the meantime, laser PIs or users must take the following immediate actions:

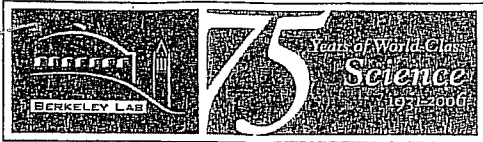
1. Test all interlocks to verify proper function. Class IV laser systems are required to have interlocks. If Class IV laser safety interlocks function cannot be verified, then laser operations must be suspended until corrected. Temporary laser use authorizations may be granted by the Laser Safety Officer on a case-by-case basis (provided administrative controls are feasible). If your laser operation is suspended, BSO **WILL** inform respective DOE Program offices.
2. Replace burned out bulbs in lighted laser warning signs and interlock panels.
3. Ensure that proper laser protective eyewear is available, stored and used.
4. Keep work areas (in particular, laser tables) clean and free of reflective objects,
5. Inspect signage on doors and entryways to make sure information is current,
6. Review accuracy of information in Laser Use Authorizations, and

7. Ensure all laser users' eye exams and laser safety training are current.

The above issues require urgent and immediate attention. Users should confirm to you that their systems have been inspected and corrective actions are being implemented. For laser interlock solutions or any other assistance, please contact your Division Safety Coordinators, or, Larry McLouth at X5286. Thanks.

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Phyllis Pei, Division Director
Environment, Health, Safety and Security
Lawrence Berkeley National Lab
One Cyclotron Road
MS 90R1140
Berkeley, CA 94720
Phone: 510.486.4724
Fax: 510 486 7488
Email: pcpei@lbl.gov



Environment, Health & Safety Division

March 29, 2006
Dir-06-014

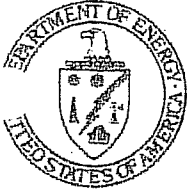
To: Aundra Richards, Manager
DOE – Berkeley Site Office

From: Howard Hatayama, Acting Director
Berkeley Lab – EH&S Division

Re: Request for Extension of Completion Date for the Laser Safety Corrective Action Plan dated 12/16/05

Ten Laser Program corrective actions (CAs) are being tracked on a biweekly basis by Berkeley Lab and BSO staff. Six of the ten CAs are complete as described below.

1. Review and validate the comprehensiveness and accuracy of the laser inventory.
2. Develop a clear policy on how to handle laser amplifiers in the laser inventory
2/24/06: **COMPLETE**. Definition added to laser inventory.
3. Report interlock access control deficiencies as an ORPs Management Concern and track findings and corrective actions.
4. Add laser safety program management resources.
1/13/06: **COMPLETE**. The laser safety program is in the IH Group (Group Leader: Paul Blodgett). Larry McLouth is the program manager (administers AHD & laser inventory programs, coordinates safety inspections and interfaces with management, customers and the Berkeley Site Office).
5. Conduct comprehensive field inspections of all laser laboratories and work authorizations to determine compliance with our laser safety requirements.
6. Notify senior line management of these deficiencies for their high level attention and resolution.
1/13/06: **COMPLETE**: EH&S Division Office sent email to senior line management on 12/21/05.
7. Engage a laser safety consultant to assist us in identifying programmatic and technical weaknesses and recommend solutions.
3/21/2006: **COMPLETE**: Laser Safety consultant on board and providing service 3 days per week.
8. Form a task force (EHS, Facilities, Fire Protection, Electrical Safety and Scientists) to standardize laser interlocks and to facilitate cost effective installations.
9. Work with the Laser Safety Committee to resolve technical concerns, policies and implementation issues.
1/13/06: **COMPLETE** This is ongoing and covers a broad scope of technical and programmatic issues. The amplifier issue (previously discussed) is one example.
10. Set up management progress reviews of above items between LBNL and BSO every two weeks until all issues are resolved.
1/13/06: **COMPLETE**. Calendar appointments have been made.



Department of Energy
Office of Science
Berkeley Site Office
Lawrence Berkeley National Laboratory
1 Cyclotron Road, MS 90-1023
Berkeley, California 94720

APR 19 2006

Howard Hatayama
Acting EH&S Division Director
Lawrence Berkeley National Laboratory
1 Cyclotron Road (MS 90R-1140)
Berkeley, CA 94720

Subject: Revised Completion Dates for the LBNL Laser Safety Corrective Action Plan

Reference: "Request for Extension of Completion Dates for the LBNL Laser Safety Corrective Action Plan dated 12/16/05", Howard Hatayama to Aundra Richards (March 29, 2006)

Dear Mr. Hatayama:

The Berkeley Site Office (BSO) has reviewed your request for a extension of the completion date from April 30, 2006 to September 30, 2006 for the corrective actions described in the referenced letter. In light of the conditions and events detailed in your letter, the BSO grants the extension, provided the Lab meets the following three conditions:

1. Assign each outstanding corrective action a target completion date.
2. Develop a plan to assure that laser safety requirements are implemented during the suspension of field inspections.
3. Add a corrective action to replace the retired Laser Safety Officer.

Please respond to these conditions by April 25, 2006.

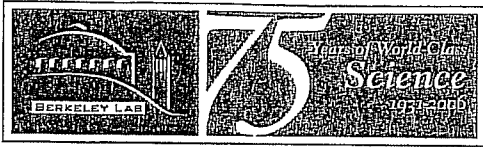
Contact Neil Landau at neil.landau@bso.science.doe.gov or at extension 6479 for additional information.

Sincerely,

A handwritten signature in cursive script, reading "Aundra Richards", is written over the typed name.

Aundra Richards
Site Manager
Berkeley Site Office

cc: C. Ingram, BSO
H. Carwell, BSO
N. Landau BSO
P. Blodgett, LBNL



Environment, Health & Safety Division

April 24, 2006

DIR-06-019

To: Ms. Aundra Richards
Manager, DOE Berkeley Site Office

From: Howard K. Hatayama, Acting Director
EH&S Division *Signature for Howard*

Subject: "Revised Completion Dates for the LBNL Laser Safety Corrective Action Plan", Aundra Richards to Howard Hatayama (April 19, 2006)

The EH&S Division received your letter granting the extension of the Corrective Action Plan (CAP) completion date from April 30, 2006 to September 30, 2006. In this letter, you requested we:

1. Assign each outstanding corrective action a target completion date.
2. Develop a plan to assure that laser safety requirements are implemented during the suspension of field inspections.
3. Add a corrective action to replace the retired Laser Safety Officer.

I will address each request below:

1. Assign each outstanding corrective action a target completion date.

The following is the list of the open corrective actions (CA) with target completion dates:

- a) Review and validate the comprehensiveness and accuracy of the laser inventory. Target Completion Date: **September 30, 2006**
- b) Report interlock access control deficiencies as an ORPs Management Concern and track findings and corrective actions. Target Completion Date: **June 30, 2006**
- c) Conduct comprehensive field inspections of all laser laboratories and work authorizations to determine compliance with our laser safety requirements. Target Completion Date: **September 30, 2006**
- d) Form a task force (EHS, Facilities, Fire Protection, Electrical Safety and Scientists) to standardize laser interlocks and to facilitate cost effective installations. Target Completion Date: **August 31, 2006**

2. Develop a plan to assure that laser safety requirements are implemented during the suspension of field inspections.

I will request that the Laboratory Division Directors include laser operations in their regular management walk-arounds and will ask them to provide me with an update on the laser safety actions requested in December, 2005. I will further inform them that the EH&S Division will complete comprehensive laser safety inspections by the end of September 2006 and request their collaboration. This will be followed up with an email to the Directors.

Status of Laser Safety Corrective Actions
Bldg 90 Rm 2063
5/24/06

6 of 11 actions completed

1. Review and validate the comprehensiveness and accuracy of the laser inventory:
 - 1/13/06: Laser inventory completion is evaluated during scheduled walkthroughs with divisions (see 5th bullet). MSD walkthroughs completed and laser inventory changes were documented on worksheets.
 - 1/27/06: Will meet with MSD Safety Coordinator to update laser inventory. Resumed walkthroughs with Chemical Sciences on a limited scale. Hope to ramp up after addressing customer support issues. Receiving LSO assistance from LLNL.
 - 2/10/06: (NOTE: Combined field inspection and inventory action items into a single one since they are closely related.) Meeting scheduled with MSD on Feb 17 to transfer data to inventory. Chemical Sciences inspections resuming. Most efforts are directed at customer support.
 - 2/24/06: No additional safety inspection walkthroughs have been completed since last meeting. Gave MSD Coordinator laser inventory worksheets for uploading.
 - 3/10/2006: Will use laser safety consultant to assist in uploading MSD inventory data. Met with Neil Landau on 2/27/05 to define scope of laser inventory and conduct of walkthroughs. No walkthroughs conducted this period – efforts focused on customer support.
 - 3/21/2006: No walkthroughs conducted this period – efforts focused on customer support. Neil Landau approved inventory and walkthrough scope after making an editorial change and requesting access to CATS. Note: Sent email on 3/17/06 to correct an error: The scope applies to Class 3b and 4 lasers. The original email listed Class 3 and 4 lasers.
 - 4/07/2006: No walkthroughs conducted this period – efforts focused on customer support. EH&S sent memo to BSO requesting extension of completion date for corrective actions to Sept 30, 2006.
 - 4/19/2006: No walkthroughs conducted this period. EH&S awaiting response from BSO, re- extension of completion date for corrective actions to Sept 30, 2006. Neil Landau requested to observe field activities involving laser safety consultant. Invited Neil to observe an EETD Laser Lab Observation session (EHS 287) conducted on 4/12/06.
 - 5/10/2006: BSO approved new CAP date. The due date has been extended to 9/30/06.
 - 5/24/06: Walkthroughs resuming using systematic approach. Inviting BSO to observe.
2. Develop a clear policy on how to handle laser amplifiers in the laser inventory
 - 1/13/06: Discussed this at the 12/21/05 Laser Safety Subcommittee meeting. The preliminary recommendation is to list only Class IIIb and IV lasers in the inventory and to use the AHD to describe how light hazard conditions are changed by amplifiers.
 - 1/27/06: Agreed on proposed policy at the 1/19/06 Laser Safety Subcommittee meeting. Laser inventory should include only true lasers. These are defined as devices that are designed/used as optical resonators to store or build-up energy in an electromagnetic wave and that have a purposefully designed or clearly identifiable method for output coupling. Class IIIb and IV lasers are required to be entered into the inventory. Hazards associated with beam modification (such as amplifying or frequency doubling) will be addressed in the AHD.
 - 2/10/06: Adding definition to the inventory is in progress.
 - 2/24/06: **COMPLETE**. Definition added to laser inventory.
3. Report interlock access control deficiencies as an ORPs Management Concern and track findings and corrective actions:
 - 1/13/06: ORPS submitted on 12/16/05.
 - 1/27/06: MSD Management Review scheduled to resume Monday 1/30/06. Causes, corrective actions and lessons learned stemming from this investigation will be reported through ORPS. Due date is 3/1/06.
 - 2/10/06: MSD Management Review Panel reconvened to discuss completion of investigation. Scheduling for remaining 3 interviews is underway.
 - 2/24/06: In progress – Remaining meetings have been scheduled.
 - 3/10/2006: In progress – MSD Management Review Team completed interviews with PIs, Post Docs and Grad Students. Draft in preparation.
 - 3/21/2006: Neil Landau commented the investigation scope of this management concern is too narrow. He felt that we should go beyond MSD since the condition was found in another division (CSD).
 - 4/07/2006: MSD draft report written & undergoing review. OAA extended due date to May 1. Reviewed EH&S approach to resolve ORPs with Neil Landau on 3/21/06. He approved, but suggested we note that corrective actions will be extended to other Divisions.

Status of Laser Safety Corrective Actions
Bldg 90 Rm 2063
5/24/06

4/19/2006: Review finished and awaiting completion of MSD report.

5/10/2006: Final MSD report not issued. Will develop an ORPS close out deliverable and review with BSO. ORPS extended to June 1, 2005.

5/24/06: Provided OCA list of corrective actions for review. Requested advice on how to close out.

4. Add laser safety program management resources:
1/13/06: **COMPLETE**. The laser safety program is in the IH Group (Group Leader: Paul Blodgett). Larry McLouth is the program manager (administers AHD & laser inventory programs, coordinates safety inspections and interfaces with management, customers and the Berkeley Site Office).
5. Conduct comprehensive field inspections of all laser laboratories and work authorizations to determine compliance with our laser safety requirements.
1/13/06: Completed MSD walkthroughs. Inspection findings were given to the DSC. Other walkthroughs have not been scheduled due to LSO's departure and time constraints resulting from Dr. Chu's request to walkthrough spaces and the upcoming Peer Review Panel.
1/27/06: Resumed Chem Sciences on a limited scale. Hope to ramp up after addressing customer support. Receiving LSO assistance from LLNL.
2/10/06: (NOTE: Combined field inspection and inventory action items into a single one since they are closely related.) Meeting scheduled with MSD on Feb 17 to transfer data to inventory. Chemical Sciences inspections resuming. Most efforts are directed at customer support.
2/24/06: No additional safety inspection walkthroughs have been completed since last meeting. Gave MSD Coordinator laser inventory worksheets for uploading.
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5/10/2006: BSO approved new CAP date. The due date has been extended to 9/30/06.
5/24/06: Walkthroughs resuming using systematic approach. Inviting BSO to observe.
6. Notify senior line management of these deficiencies for their high level attention and resolution.
1/13/06: **COMPLETE**: EH&S Division Office sent email to senior line management on 12/21/05.
7. Engage a laser safety consultant to assist us in identifying programmatic and technical weaknesses and recommend solutions.
1/13/06: We're in the process of selecting an LSO consultant from several candidates. Will provide customer support and programmatic review.
1/27/06: Completed PD for new LSO posting. Narrowed consultants down to 3 candidates. Plan to interview them next week.
2/10/06: Made selection, PO in progress. Main emphasis will be to support operations and to do walkthroughs/inspections. Posted LSO position on the web. Interview committee selection underway.
2/24/06: PO to consultant issued today. Interview panel candidate members identified. Selection still in progress.
3/10/2006: Laser consultant scheduled to arrive on Tuesday March 14, 2006. Interview panel selection completed for new hire. Soliciting more job candidates.
3/21/2006: **COMPLETE**: Laser Safety consultant on board. Providing service 3 days per week.
8. Form a task force (EHS, Facilities, Fire Protection, Electrical Safety and Scientists) to standardize laser interlocks and to facilitate cost effective installations.
1/13/06: Formation of committee and identification of candidate members have has been discussed between Facilities and EH&S.

Status of Laser Safety Corrective Actions

Bldg 90 Rm 2063

5/24/06

1/27/06: Met with Mike Dong (Facilities Mechanical & Electrical Section Head) to identify code requirements and Facilities procedures for installing interlocks. Examining code requirements is underway.

2/10/06: Meeting on *ad hoc* basis with FAC electrical engineering personnel. Identified code requirements. Meeting scheduled for next week.

2/27/06: Institutional task force pending. Per 2/15/06 meeting with Facilities, Lab built interlock boxes may be preferred as "standard" installation. Revised Laser Interlock Design and Installation Checklist. Agreed to joint Fac/EH&S commissioning inspection for newly installed interlocks.

3/10/06: Will commission interlocks in Chem Sciences next week.

3/21/06: Commissioned interlocks in 3 Chem Sciences lab.

4/07/06: Work with Facilities is ongoing. Meeting today to review an interlock system made by Kentek.

4/19/06: Work continues. Kentek to send us hardware for evaluation. Objective is to agree on laser interlock hardware (i.e. to have a standard installation package). So far we have 1) Evaluated the Rockwell Laser Sentry and the LBNL built systems 2) Identified code requirements regarding interlocks, 3) Determined that 24 volt signal wire can be strung without conduit and without wire mold, 4) Updated the Laser Lab Interlock Request Form and 5) Developed a draft Laser Interlock Commissioning Checklist (which includes a visual inspection and functional testing). I plan to have laser users use this for routine interlock inspections. Tasks that remain to be done are: 1) Test the Kentek system 2) Develop/update a standard design and installation 3) Document this in an interlock policy.

5/10/2006: BSO approved new CAP date. The due date for interlocks has been extended to 8/31/06.

5/24/06: No significant change.

9. Work with the Laser Safety Committee to resolve technical concerns, policies and implementation issues.

1/13/06: **COMPLETE** This is ongoing and covers a broad scope of technical and programmatic issues. The amplifier issue (previously discussed) is one example.

10. Set up management progress reviews of above items between LBNL and BSO every two weeks until all issues are resolved.

1/13/06: **COMPLETE**. Calendar appointments have been made.

11. Replace the retired LSO.

4/19/2006: Added this as an action item at BSO's request. Target completion date is 6/30/06.

5/10/2006: Interviews conducted. Will make offer to leading candidate.

5/24/06: Offer is in preparation.

Attendance [check box if present, add guests in blank boxes]

	1/13/06	1/27/06	2/10/06	2/24/06	3/10/06	3/21/06	4/7/06	4/19/06	5/10/06
Kim Abbott	x								
Paul Blodgett	x	x	x	x	x	x	x	x	x
Howard Hatayama	x	x		x		x	x	x	x
Carol Ingram	x		x	x					x
Neil Landau	x	x	x		x	x	x	x	x
Eugene Lau	x	x	x	x	x	x	x		x
Larry McLouth	x	x	x	x	x	x	x	x	x
Bob Schoenlein	x								
Guests:									
Hattie Carwell							x		